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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/789,085	02/27/2004	Tetsuya Inui	60919 (70551)	7533

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EXAMINER

SONG, MATTHEW J

ART UNIT	PAPER NUMBER
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1792

MAIL DATE	DELIVERY MODE
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11/06/2007

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/789,085

Applicant(s)

INUI ET AL.

Examiner

Matthew J. Song

Art Unit

1792

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 30 August 2007.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-4, 6 and 8-10 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-4, 6 and 8-10 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- ☒ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☐ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____
- ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- ☐ Notice of Informal Patent Application
- ☐ Other: _____

DETAILED ACTION

Claim Rejections - 35 USC § 112

1. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

2. Claim 1-4, 6, and 8-10 are rejected under 35 U.S.C. 112, first paragraph, because the specification, while being enabling for CO₂ laser, does not reasonably provide enablement for all carbon gas laser. The specification does not enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to use the invention commensurate in scope with these claims. Not any carbon gas can be suitable for laser recrystallization. In other words, the invention is not enabled for methane gas laser or any other carbon gas laser, except for CO₂. Claims 2-4, 6, and 8-10 depend from claim 1, thus the same arguments apply.

3. Claims 1-4, 6 and 8-10 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. Claim 1 recites, " a solid-state laser light selected from the group comprising excimer laser light" in lines 7-8. An excimer laser is a gas laser, not a solid state laser, as evidenced by Yamazaki (US 2003/0021307) in paragraph [0080]. Applicant specification is not enabled to convert a gaseous excimer laser into a solid-state device.

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. Claim 1-4, 6, and 8-10 rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claim 1 recites, " a solid-state laser light selected from the group comprising excimer laser light" in lines 7-8. An excimer laser is a gas laser, not a solid state laser, as evidenced by Yamazaki (US 2003/0021307) in paragraph [0080]. It is unclear if applicant intends to claim gas source lasers or solid state source lasers.

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later

invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

7. Claims 1-3, 6, 8 and 10 are rejected under 35 U.S.C. 103(a) as obvious over Yamazaki (US 2003/0021307 A1) in view of Yamazaki et al (US 2002/0094613 A1).

In an apparatus for crystallizing a semiconductor film, note entire reference, Yamazaki discloses an apparatus comprising a first optical system, which includes a laser oscillation device **301a**, this clearly suggests applicant's light source; a group of lenses **302a**; mirrors **303a, 304a** and a lens **305a**, this clearly suggests applicant's objective lens ([0090]-[0094]). Yamazaki also discloses a similar second optical system where a beam can be shaped into an arbitrary form by a group of lenses and if necessary by providing a slit and the like, this clearly suggests applicant's aperture stop plate. ([0092]). Yamazaki also discloses the laser beams emitted from different laser oscillation devise have respectively different phases. ([0093]). Yamazaki also discloses applicable laser oscillation devices are gas laser oscillation devices, such as excimer lasers; and solid laser oscillation devices such as YAG lasers. ([0005]). Yamazaki et al also discloses cylindrical lens **102** for converging a laser beam ([0082]), this clearly suggests applicant's cylindrical lens array. Yamazaki et al teaches using cylindrical lens **102** for converging the laser beam, which clearly suggests applicant's condenser lens.

Yamazaki et al depicts two cylindrical lenses in Fig 1. Yamazaki et al does not teach a cylindrical lens array and a condenser lens, which at a minimum would require three lenses. It would have been obvious to a person of ordinary skill in the art at the time of the invention to modify Yamazaki et al by adding additional cylindrical lens because the mere duplication of

parts is held to be obvious (MPEP 2144.03) and Yamazaki et al teaches a group of lenses, which clearly suggests that three or more lenses would be obvious to a person of ordinary skill in the art achieve the desired convergence.

Yamazaki et al clearly suggests an array of cylindrical lenses and a condenser lens, which is capable of making irradiance distribution uniform.

Yamazaki does not explicitly teach first laser light and the second laser light have different wavelength. This limitation is viewed as intended use. A recitation of the intended use of the claimed invention must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim. The apparatus disclosed by Yamazaki is capable of performing the claimed intended use because the laser light sources can be controlled to emit any desired wavelength; therefore the first and second laser oscillation sources can be controlled to achieved different wavelengths. Yamazaki's device is capable of different wavelengths because Yamazaki teaches a wavelength converter may be integrated into the laser oscillation device to convert a fundamental wave into a second harmonic wave ([0081]). Also, Yamazaki teaches a plurality of different laser oscillation devices can be used, which have different wavelengths ([0080]).

Yamazaki does teach a first radiation means comprising YAG laser light ([0080]). Yamazaki does not explicitly teach the first laser light having a wavelength in the ultraviolet region. However, having a wavelength in an ultraviolet region, is merely an intended use limitation. A recitation of the intended use of the claimed invention must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the

claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim. Yamazaki teaches the same laser light apparatus, as applicant; therefore the apparatus is capable of performing the claimed intended use of producing laser light in the ultraviolet region.

Yamazaki does not teach the second laser light is a carbon gas laser.

In a method of manufacturing a semiconductor device using lasers, note entire reference, Yamazaki et al teaches crystallization of a semiconductor film using a solid laser or a gas laser wherein an Ar laser, Kr laser, excimer or CO₂ gas laser capable of continuous or pulse oscillation is examples of a gas laser ([0156]). A CO₂ laser clearly suggests applicant's carbon gas laser.

Yamazaki teaches a gas laser oscillation device such as an Ar laser, Kr laser or excimer laser can be used ([0080]). Therefore, it would have been obvious to a person of ordinary skill in the art at the time of the invention to modify Yamazaki by using a CO₂ laser, as taught by Yamazaki et al, because substitution of known equivalents for the same purpose is held to be prima facie obvious (MPEP 2144.06)

Referring to claim 2, the combination of Yamazaki and Yamazaki et al teaches a second optical system where a beam can be shaped into an arbitrary form by providing a slit, this clearly suggests applicant's aperture stop plate. ('307 [0092]). Yamazaki also teaches a lens 305a, this clearly suggests applicant's objective lens. Yamazaki is silent to the arrangement of the stop plate, cylindrical lens array and condenser lens (irradiance distribution uniformizing means) and the objective lens. It would have been obvious to a person of ordinary skill in the art at the time of the invention to modify the combination of Yamazaki and Yamazaki et al to have the stop

plate between the cylindrical lens array and the objective lens to converge the laser light prior to shaping.

Referring to claims 3 and 6, the combination of Yamazaki and Yamazaki et al does not disclose the arrangement of the stop plate in relationship to the optical axis. The combination of Yamazaki and Yamazaki et al teaches using a slit, a plurality of lenses, and a plurality of mirrors to shape and direct a laser beam to a target substrate, note Figure 10 of Yamazaki ('307). Therefore, it would have been obvious to a person of ordinary skill in the art at the time of the invention to modify the combination of Yamazaki and Yamazaki et al to achieve the claimed arrangement because the beam can be redirected obliquely, perpendicularly or parallel by placement of mirrors.

Referring to claim 8 and 10, the combination of Yamazaki and Yamazaki et al discloses using a lens.

8. Claims 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Yamazaki (US 2003/0021307 A1) in view of in view of Yamazaki et al (US 2002/0094613 A1) as applied to claims 1-3, 6, 8 and 10 above, and further in view of Matsushima et al (US 2001/0050271 A1).

The combination of Yamazaki and Yamazaki et al teaches all of the limitations of claim 4, as discussed previously, except the trapezoidal shape of the aperture stop plate. The combination of Yamazaki and Yamazaki et al does teach different shapes can be formed, which include circular, ellipsoid or rectangular ([0092]).

In an apparatus of processing an optical component using a laser beam, note entire reference, Matsushima et al teaches a beam mask having trapezoidal shape ([0108]-[0112]).

It would have been obvious to a person of ordinary skill in the art at the time of the invention to modify the combination of Yamazaki and Yamazaki et al using trapezoidal stop plate because a trapezoidal shape is known in the art, as taught by Matsushima et al, and changes in shape are held to be obvious (MPEP 2144.03).

9. Claims 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yamazaki (US 2003/0021307 A1) in view of Yamazaki et al (US 2002/0094613 A1) as applied to claims 1-3, 6, 8 and 10 above, and further in view of Yamazaki et al (US 2002/0117630 A1).

The combination of Yamazaki ('307) and Yamazaki et al ('613) teaches all of the claim 9, as discussed previously, except the radiation direction changing means is a prism.

In a laser illumination apparatus, note entire reference, Yamazaki et al ('630) teaches a cylindrical lens may be replaced with a multi-phase prism to decrease the number of lenses in an optical system. Yamazaki et al ('630) also teaches using prism will reduce the loss of light quality and alignment of adjustment of the optical system can be made easier.

It would have been obvious to a person of ordinary skill in the art at the time of the invention to modify the combination of Yamazaki ('307) and Yamazaki et al ('613) with Yamazaki et al ('630) prism to reduce the loss of light quality and to made the alignment of adjustment of the optical system easier.

Response to Arguments

10. Applicant's arguments, see page 5 of the remarks, filed 8/30/2007, with respect to the rejection(s) of claim(s) 1-3, 6, 8 and 10 under 35 U.S.C. 103 in view of Yamazaki have been

fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of Yamazaki in view of Yamazaki et al ('613).

11. Applicant's arguments with respect to claims 1-4, 6, and 8-10 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

12. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Kusumoto et al (US 6,242,291 B1) teaches condensing a pulsed laser beam by a cylindrical lens and irradiating the laser beam onto a substrate (col 12, ln 30-60).

13. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event,

however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

14. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Matthew J. Song whose telephone number is 571-272-1468. The examiner can normally be reached on M-F 9:00-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Barr can be reached on 571-272-1414. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Matthew J Song
Examiner
Art Unit 1792

MJS
November 1, 2007

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/Robert Kunemund/

Robert Kunemund

Primary Examiner

TC 1700